QUALITY ASSURANCE PROJECT PLAN FOR LOWER MANHATTAN INDOOR DUST TEST AND CLEAN PROGRAM

FINAL

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for
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Based on the US EPA Region 2 Guidance for the Development of Quality Assurance Project Plans for Environmental Monitoring Projects (April 2004) and the Intergovernmental Data Quality Task Force Uniform Federal Policy for Quality Assurance Project Plans Manual VI (July 2004) Must be updated to conform to requirements at time program is implemented.

TITLE AND APPROVAL PAGE

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ACRONYMS

ASTM	American Society for Standards and Materials
ACBM	Asbestos containing building materials
COC	Chain of custody
COPC	Contaminants of potential concern
cm	centimeter
cm^2	square centimeter
DCN	Document Control Number
DEP	New York City Department of Environmental Protection
DOL	Department of Labor
DQI	Data quality indicator
EDD	Electronic data deliverable
EMSL	EMSL Analytical, Inc.
EPA	Environmental Protection Agency
EPIC	Environmental Photographic Interpretation Center
ERRS	Emergency Rapid Response Services
f/cc	fibers per cubic centimeter
f/cm^2	fibers per square centimeter
GC	Gas chromatograph
GC/MS	Gas chromatograph/mass spectrometer
GIS	Geographic information system
HASP	Health and safety plan
HAZWOPER	Hazardous waste operations
HUD	Housing and Urban Development
HVAC	Heating, ventilation, and air conditioning
ICP	Inductively coupled plasma
IDQTF	Intergovernmental Data Quality Task Force
L	Liter
L/min	Liters per minute
LBP	Lead-based paint
MDL	Method detection limit
mg/cm^2	milligrams per square centimeter
mg/m^2	milligrams per square meter
ml	milliliter
mm	millimeter
MMVF	man-made vitreous fibers
MPC	Measurement performance criteria
MS/MSD	Matrix spike/matrix spike duplicate
NEA	Northeast Analytical Inc.
NYS	New York State
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
PAHs	Polycyclic aromatic hydrocarbons

PARCC	Precision, accuracy, representativeness, completeness, and comparability
PCM	Phase contrast microscopy
PCMe	Phase contrast microscopy equivalent
PT	Proficiency testing (previously known as performance evaluation (PE) sample)
PQOs	Project quality objectives
QA	Quality assurance
QATS	Quality Assurance and Technical Support
QC	Quality control
QAPP	Quality assurance project plan
QL	Quantitation limit
s/cc	Structures per cubic centimeter
s/cm^2	Structures per square centimeter
SAP	Sampling and analysis plan
SAT 2	Site Assessment Team 2
SC	Site Coordinator
sf	square foot
Sample ID	Sample identification number
SEM	Scanning electron microscope
SOPs	Standard operating procedures
TEM	Transmission electron microscopy
TSA	Technical systems audit
UCL	Upper confidence level
UFP	Uniform Federal Policy
$\mu g/ft^2$	micrograms per square foot
$\mu g/m^2$	micrograms per square meter
WAM	Work Assignment Manager
WTC	World Trade Center
XRF	X-ray fluorescence

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1.0 INTRODUCTION

Presented herein is the site Quality Assurance Project Plan (QAPP) for the Lower Manhattan Indoor Dust Test and Clean Program. The site QAPP has been developed in accordance with the United States Environmental Protection Agency (EPA) requirements for Quality Assurance Project Plans, EPA QA/R-5, EPA/240/B-01/003, March 2001 and the *Uniform Federal Policy for Quality Assurance Project Plans* (the UFP-QAPP Manual), EPA 505-B-04-900A, Version 1, July 2004. This plan is based on information currently available and may be modified on site in light of field observations/results and other acquired information. Any modifications or deviations from this QAPP shall be approved by EPA and documented. Procedures for modifying the QAPP are discussed in Section 12.1, Assessment Findings and Corrective Action Responses.

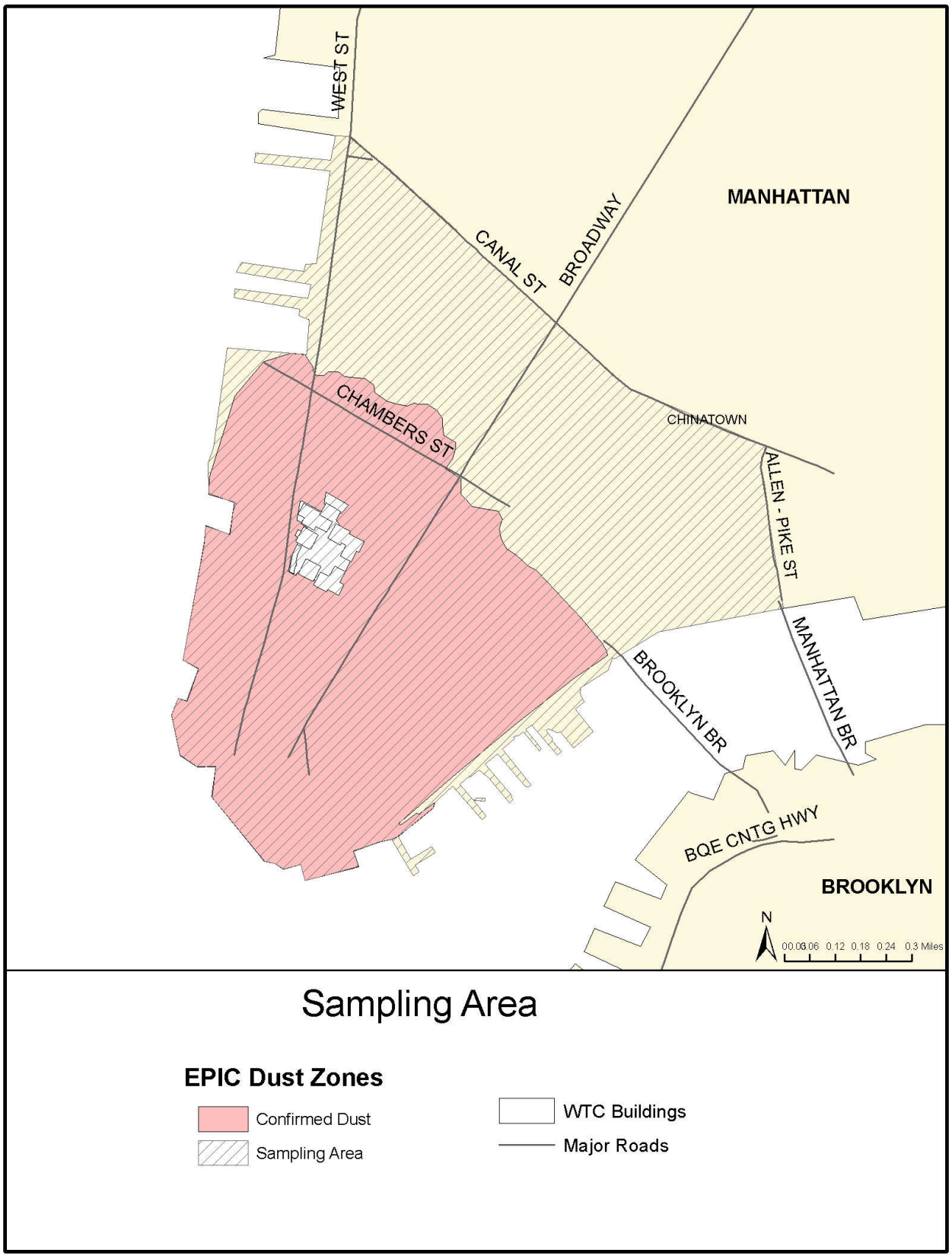
The area that is included in this program is bounded on the north by Canal Street and on the east by Allen-Pike Street. Figure 1 shows the area that is included in this program. The Weston Solutions, Inc. (Weston) Site Assessment Team 2 (SAT 2) contract has been tasked by the EPA to conduct field sampling for all of the units and buildings assigned in the area. If any cleanup work is required due to the criteria specified in the "Lower Manhattan Dust Test and Clean Program Plan" Sampling and Analysis Plan (SAP) for this program, that work shall be conducted by licensed asbestos and/or lead contractors and certified asbestos and/or lead workers (Cleanup Contractor) licensed and certified by the New York City Department of Environmental Protection (DEP) and/or the New York State Department of Labor (DOL). The EPA will issue a work assignment under the Emergency Rapid Response Services (ERRS) contract for the Cleanup Contractor.

SAT 2 is to conduct site inspections, surveys and assessments, scheduling, coordinating and monitoring the collection of environmental samples; and coordinating their activities with those of EPA and with the cleanup of dust/debris, if necessary, from buildings. The full scope of work is detailed in the SAT 2 contract Scope of Work. EPA's Site Coordinator (SC), shall provide overall technical oversight for the project. The EPA shall provide technical assistance to ensure that the work conducted is completed safely, efficiently, and in compliance with the Scope of Work and all applicable laws, rules and regulations.

This QAPP addresses the following environmental data collection aspects of the program: wipe samples shall be analyzed for the contaminants of potential concern (COPC) lead and polycyclic aromatic hydrocarbons (PAHs); microvac samples shall be analyzed for the COPC asbestos and man-made vitreous fibers (MMVF); and air samples shall be analyzed for asbestos and MMVF. Where possible indoor air, wipe and microvac samples will be taken in proximate locations, so that for each location sampled within a unit, there will be measurements of the four COPC.

Note that the various specifications and requirements (such as, but not limited to, sampling and analytical procedures, sample quantities, and QC activities) shall be modified to conform to the final sampling plan and thereafter periodically reviewed to reflect project experience. This QAPP shall then be updated accordingly**.** These changes shall be signed by project management, attached to the QAPP, and distributed to all who have received the QAPP.

FIGURE 1
PROPOSED SAMPLING AREA



1.1 Distribution List

The Distribution List documents who shall receive copies of the approved QAPP and any subsequent revisions or amendments to the QAPP. The recipients listed below shall distribute the QAPP to appropriate members of their respective organizations. A complete copy of the QAPP and any subsequent revisions shall be maintained on file at EPA, 290 Broadway, New York, NY 10007 and will be available upon request. The Distribution List is identified in Table 1 of this QAPP.

TABLE 1
DISTRIBUTION LIST

QAPP Recipients	*Title*	*Organization*	*Telephone Number*	*Fax Number*	*E-mail Address*	*Document Control Number*
Pat Evangelista	WTC Coordinator	EPA	212-637-4449	212-637-4445	evangelisat.pat@epa.gov	001
Dennis Santella	Site Coordinator	EPA	212-637-3559	212-637-3561	santella.dennis@epa.gov	002
Catherine Romano	Project Officer	EPA	212-637-4339	212-637-3256	moyik.cathy@epa.gov	003
Tanya Mitchell	Project Officer	EPA	212-637-4362	212-637-4393	mitchell.tanya@epa.gov	004
Kai Tang	Project QA Officer	EPA	732-321-4362	732-321-6616	kantz.marcus@epa.gov	005
Dennis Foerter	Work Assignment Project Manager	Weston	732- 417-5842	732-417-5801	dennis.foerter@westonsolutions.com	006
	Project Manager	ERRS				007
Robert DeMalo	Vice President, Laboratory Services	EMSL Analytical	800-220-3675	--	rdemalo@emsl.com	008
Ann Casey	Marketing and Program Development Manager	Northeast Analytical	518-346-4592	--	annc@nealab.com	009
Shellee McGrath	Task Order Leader	Shaw Environmental	702-895-7219	702-795-8210	Shellee.mcgrath@shawgrp.com	010

1.2 Project Personnel Sign-Off Sheet

The Project Personnel Sign-Off Sheet documents that all key project personnel performing work have read the applicable sections of the QAPP and shall perform the tasks as described. For example, the laboratory manager who receives the QAPP shall have all supervisory personnel sign off on the applicable analysis sections of the QAPP before beginning sample analysis. Supervisory or oversight personnel are responsible for communicating the requirements of the applicable portions of the QAPP to those doing work. Although it is not always possible to identify people by name early in the planning stages, the project team shall identify by function (e.g., laboratory QC manager) all personnel who are to read and sign off on the applicable sections of the QAPP. Attachment 1 contains the Project Personnel Sign-Off Sheet.

2.0 PROJECT ORGANIZATION

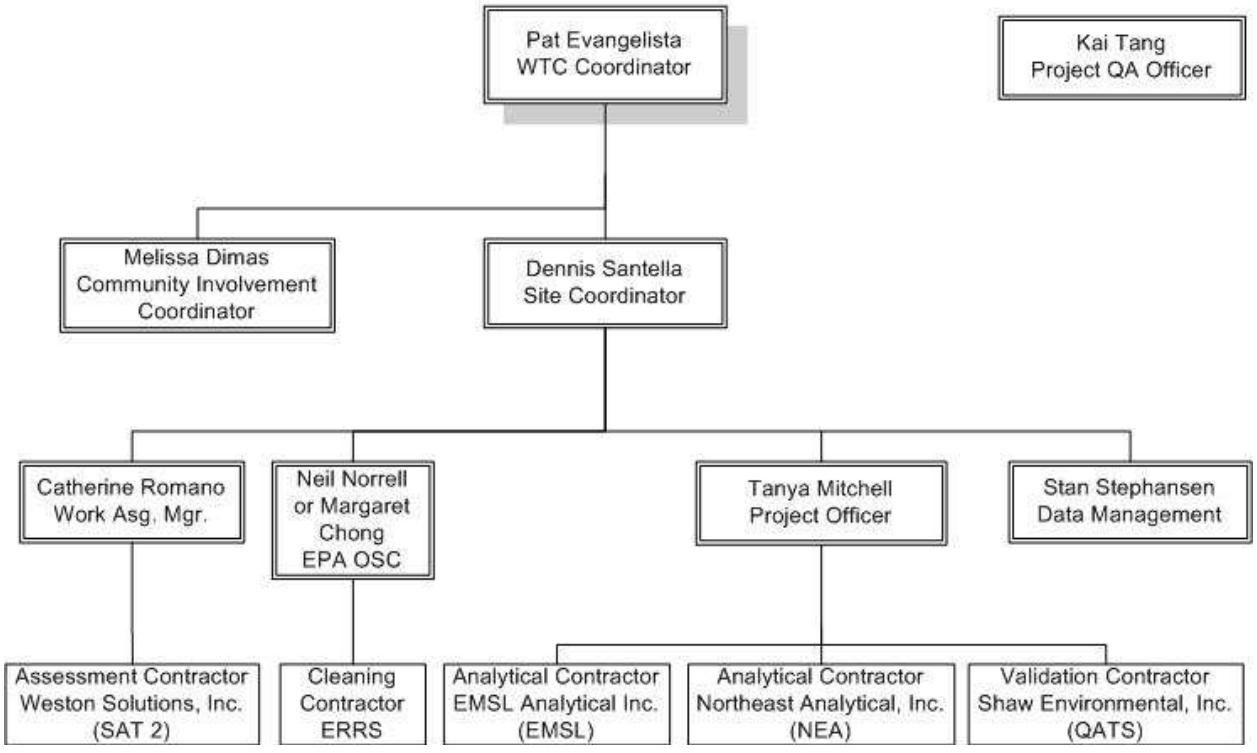
Sections 2.1 through 2.5 of this QAPP identifies the reporting relationships between the organizations, project team members, and other key project personnel and describe their specific roles, responsibilities, and qualifications. In addition, the QAPP includes an explanation of the lines of authority and paths of communication.

EPA shall have the oversight authority for all work conducted for this project. SAT 2 shall schedule and oversee the work of the sampling team, conduct environmental sampling and assessments, arrange for the shipment of field samples and quality control (QC) samples to the laboratories, input the relevant data into the appropriate databases, and other similar duties as described in its contract Scope of Work. The analytical laboratories shall conduct the required analysis within the requested turnaround time, input the relevant analytical data into the appropriate databases, arrange for the shipment of archival samples, and other similar duties as described in its contract Scope of Work. The cleaning contractor is responsible for scheduling and coordinating the cleaning work with residents, building owners, the SAT 2 and EPA; cleaning residences, common spaces and portions of heating, ventilation, and air conditioning (HVAC) systems identified by EPA; and the conduct of any personal air monitoring required by EPA, Occupational Safety and Health Administration (OSHA), DEP or Department of Labor (DOL). All data for this project are considered confidential and only the EPA SC is authorized to allow their release.

2.1 Project Organization Chart

The Project Organizational Chart shows the reporting relationships between all of the organizations involved in this project, including the lead organization (i.e., EPA) and all contractors and subcontractors. The project organizational chart is shown in Figure 2 of this QAPP.

FIGURE 2
PROJECT ORGANIZATIONAL CHART



2.2 Communication Pathways

The flow of information for this project will be as described below:

1. SAT 2:
   a. Receives file of selected residences and buildings from EPA and schedules meetings with residents/owners,
   b. Inspects residences and buildings using survey form. Information captured electronically in spreadsheet or other approved electronic system; data file is uploaded to EPAOSC website daily
   c. Collects samples; enters data into local copy of Scribe; creates chain of custody (COC) forms and labels and delivers samples to the laboratory; up loads Scribe data base to Scribe.net daily.
   d. Communicates daily with laboratories to ensure sample receipt and determine if there are any problems

2. Laboratories:
   a. Receive and log-in samples with COC
   b. Analyze samples
   c. Create electronic data deliverable (EDD) containing sample results
   d. Email EDD to Quality Assurance and Technical Support (QATS) contractor
   e. Fax/email COCs to QATS

3. QATS:
   a. Subscribes to Scribe.net to receive field sample data into local copy of Scribe
   b. Receives emailed EDDs
   c. Receives COCs via fax or email
   d. Verify/validate laboratory data and updates EDD
   e. Loads EDD into local copy of Scribe
   f. Uploads verified/validated Scribe data to internet
   g. Emails EPA Summary Report

4. EPA Region 2:
   a. Subscribes to Scibe.net to receive Sample, Laboratory and Quality Assurance (QA) information into Scribe and Region 2 Oracle database
   b. Loads inspection information into Region 2 Oracle database
   c. Performs final review and QA of data
   d. Web-based management reports, graphs and Geographical Information System (GIS)/map views allow viewing of latest data
   e. Notifies residents/building owners of sampling results via mailed reports

5. Occupants and Building Owners/Operators:

   a. Cleaning recommendation, if necessary, will be offered by the EPA

b. Written notifications of analytical results will be provided by the EPA

The following communication drivers are those activities that shall necessitate communication between the SAT 2 Project Manager and EPA's SC. These drivers shall include:

- Approval of amendments to the QAPP;
- Initiation, notification and/or approval of real time modifications;
- Notification of delays or changes to field work;
- Recommendations to stop work and initiation of corrective action; and
- Reporting of issues related to analytical data quality, including, but not limited to, ability to meet reporting limits and turn around times.

All other communication not identified above shall be coordinated through the EPA Project Officer.

2.3 Data Confidentiality

The residential and building information and the environmental data collected for the project shall be used by the EPA to evaluate whether a unit or a building has been impacted by the COPC and to determine if a cleaning is necessary. Although the data are collected only for informational use and not for enforcement purposes, the information shall be considered confidential. Only the EPA is authorized to release any data collected for this project. EPA shall only share individual unit's information with the person who signed the access agreement for the unit or his or her designated representative. Building owners/operators shall receive the various unit data from common or other areas to which they provide access. However, the EPA may aggregate the individual unit data without personal-identifiable information for further studies or reports and common area results may be provided to building occupants and others upon request.

2.4 Personnel Responsibilities and Qualifications

The EPA has the oversight authority for all work conducted for this project. SAT 2 shall schedule and oversee the work of its sampling team and their sub-contractors, conduct environmental sampling and assessments, arrange for the shipment of field samples and QC samples to the laboratories, input the relevant data into the appropriate databases, and other similar duties as described in its contract Scope of Work. The analytical laboratories shall conduct the required analyses within the requested turnaround time, input the relevant analytical data into the appropriate databases, arrange for the shipment of archival samples, and other similar duties as described in its contract Scope of Work. The cleaning contractor is responsible for scheduling and coordinating the cleaning work with residents, building owners, the monitoring contractor and EPA; cleaning residences, common spaces and portions of HVAC systems identified by EPA; and the conduct of any personal air monitoring required by EPA, OSHA, DEP or DOL.

2.4.1 EPA Responsibilities

EPA has prepared the draft sampling QAPP. The EPA SC shall provide technical assistance to ensure that the sampling work and cleanup activities, if necessary, are completed safely, efficiently, and in compliance with the applicable Scope of Work and all applicable laws, rules and regulations. EPA has contracting authority for the SAT 2 and any site-specific sampling/cleanup contracts and the appropriate EPA Contracting Officer shall process any disputes or claims. The EPA has arranged for the laboratory analysis of all of the air, microvac, and wipe samples. SAT 2 is responsible for transfer of custody of the samples to the laboratories via same-day hand-carry delivery or by courier for next day delivery as per the SAT 2 Contract.

The EPA Project Officer has the designated responsibility for approving and accepting final products and deliverables.

EPA's QATS contractor is responsible for designing and implementing a program to review all laboratory data analysis to achieve the following objectives: Data Review, Validation and/or Verification, and Reconciliation with User Requirements.

The EPA shall notify occupants and building owners as specified in Section 2.2 (Communication Pathways). No contractor or any of the subcontractors are authorized to release residential and non-residential area sampling results except, at the direction of the EPA.

2.4.2 SAT 2 Responsibilities

SAT 2 and its subcontractors involved in the activities at buildings under this project are responsible for completing a Level 2 Background Check, in accordance to the SAT 2 contract, on their employees before beginning on-site work and for screening unacceptable candidates from the pool of on-site workers.

SAT 2 shall adapt, adopt and follow this QAPP for all environmental data collection activities performed for this project. All appropriate data, original field forms/data sheets, and COC forms shall be collected and completed in accordance with the instructions contained in the contract and provided to EPA.

SAT 2 shall have available sufficient qualified personnel and sufficient quantities of sampling equipment to provide the amount and type of samples required for this project. SAT 2 must follow the established QA activities for all phases of field sampling work and laboratory QC checks.

If necessary, SAT 2 and its subcontractors involved in the activities at buildings under this project are responsible for conducting personal air monitoring and arranging for the sample analysis in accordance with OSHA regulations. Any test results will be provided to the EPA and OSHA for their evaluation and provide test results to their employees.

SAT 2 or its subcontractors shall collect the samples from the buildings. SAT 2 shall collect post-cleanup samples from certain units and/or buildings as directed by EPA. SAT 2 will schedule and conduct surveys to provide positive identification of indoor lead, asbestos, and MMVF sources as directed by the EPA Work Assignment Manager (WAM). EPA will assign surveys if the presence of indoor lead, asbestos and MMVF is suspected as a result of conditions observed during the initial unit inspection or during subsequent sampling activities. Also, surveys will be conducted to determine if sampling result exceedances are attributed to sources within or adjacent to the place of business or residence. COPC source surveys will be conducted in accordance with Attachments 4B and 4C. On-site X-ray fluorescence (XRF) technology will be utilized to determine concentrations of lead based paint (LBP) in milligrams per square centimeter (mg/cm^2). The XRF will be utilized in accordance with Attachment 4E. Bulk sampling activities will be conducted on-site by SAT 2 (for asbestos/MMVF) or a subcontractor (for LBP).

The sampling and analytical methods for bulk samples (asbestos/MMVF and lead) are specified in attachments 4B and 4C. If bulk samples are required, a modification to this QAPP will be made. This modification will incorporate specific environmental data ensuring that sampling methods, analytical procedures, sample quantities, and QC activities are met.

SAT 2 shall keep a field notebook, document the size of the sampled area, sampling locations and equipment used to collect the samples. In addition, date, start and completion dates, sample media, filter type, lot numbers of filter media, time (start/finish), weather, units, QA samples (lot blank) sampling dates and sample identification numbers (sample IDs), complete COC forms, EPA Project Tracking Numbers and laboratory address shall be entered into Scribe within 24 hours of activity.

2.4.3 Analytical Laboratory Responsibilities

Subsections 2.4.3.1 through 2.4.3.3 describes the analytical laboratory responsibilities for this project.

2.4.3.1 Lead, PAHs, MMVF, and Asbestos Wipe, Microvac and Air Samples

Northeast Analytical Inc. (NEA) has been retained by the EPA for the sample analyses for lead and PAHs from wipe samples. It is responsible for conducting the analyses in accordance with the specified methods, submitting the test results to the EPA in the form and within the time specified by the EPA. Contact and shipping information for NEA are listed below:

Northeast Analytical Inc.
2190 Technology Drive
Schenectady, NY 12308
(518) 346-4592

EMSL Analytical, Inc., (EMSL) has been retained by the EPA for the sample analyses for MMVF and asbestos from microvac and air samples. It is responsible for conducting the

analyses in accordance with the specified methods, submitting the test results to the EPA in the form and within the time specified by the EPA. Contact and shipping information for EMSL are listed below:

EMSL Analytical, Inc.
307 West 38th Street
New York, NY 10018
(212) 290-0051

The analytical requirements for all samples are presented in Table 2.

TABLE 2
ANALYTICAL SENSITIVITY REQUIREMENTS

Sample Type	Analytical Method	Benchmarks	Sensitivities s	Reporting Units
Indoor Air	40 CFR Part 763 (Asbestos Hazard Emergency Response Act [AHERA]/PCMe) NIOSH 7400 (confirmed with Scanning Electron Microscope (SEM) if f/cc > .009)	.0009 Asbestos phased contrast microscopy equivalents (PCMe) .01 MMVF	0.0004 Asbestos 0.004 MMVF	s/cc Asbestos f/cc MMVF
Microvac	ASTM D 5755-03 ASTM d 5755-03 (SEM)	5000 Accessible Asbestos and MMVF 50000 infrequently accessible Asbestos and MMVF	<1000 Asbestos <1000 MMVF	Structures per square centimeter (s/cm^2) Asbestos fibers per square centimeter (f/cm^2) MMVF
PAHs Wipe	EPA Method SW-846 8270D	Accessible loading greater than 150 micrograms per square meter ($\mu g/m^2$) and infrequently accessed loading greater than 1500 milligrams per square meter ($\mu g/m^2$)	<0.005 mg/m^2	$\mu g/m^2$
Metal Wipes	Lead EPA Method SW-846 6010C	Accessible lead wipe loading greater than 40 micrograms per square foot ($\mu g/ft^2$) and infrequently accessed loading greater than 400 $\mu g/ft^2$.	2 $\mu g/ft^2$	$\mu g/ft^2$

*Bulk samples, if required for asbestos/MMVF and lead will be analyzed as specified in Attachments 4B and 4C.

NEA and EMSL are also responsible for preparing the post-analysis samples for archival purposes and transferring custody of the same as required by the EPA.

2.4.3.2 Laboratory Turnaround Time

The laboratory contractor shall analyze all samples at the specified time noted on the COC. All turnaround time discrepancies between the COC and the QAPP shall be reported to the EPA Project Officer. The requested laboratory analysis result turnaround times, for the air, microvac samples and wipe samples are summarized in Table 3 below.

TABLE 3
LABORATORY TURNAROUND TIME FOR SAMPLE ANALYSIS

Parameter	Sampling Technique	Analysis Laboratory	Requested Analysis Turnaround Time	Validated Results (Post Analysis)	Verification/Validation Turnaround Time
Lead	Wipe	**NEA**	**28 days**	3 days	14 days
PAHs	Wipe	**NEA**	**28 days**	3 days	14 days
MMVF	Microvac, air	**EMSL**	**7 days**	3 days	7 days
Asbestos	Microvac, air	**EMSL**	**7 days**	3 days	7 days

* Bulk samples, if required for asbestos/MMVF and lead, will be analyzed as specified in Attachments 4B and 4C

2.5 Special Training Requirements and Certification

All management and field personnel conducting sampling activities must have extensive experience in the implementation of field sampling programs. Prior to work on this project, field team and laboratory personnel shall receive project-specific training regarding the requirements of this project as detailed in this QAPP and the project Health and Safety Plan (HASP). In addition each employee will receive site-specific training that includes: Location and description of potential hazards and risks such as friable asbestos or peeling, chalking paint that may contain lead. Personnel entering exclusion or contamination zones for the purpose of monitoring cleanup-abatement activities must have received the required 40-hour training as outlined by 29 CFR 1910.120(a) (i) and appropriate annual refresher training as required. This hazardous waste operations training (HAZWOPER) training requirement may be removed, should sampling indicate training requirement downgrade is appropriate. Other personnel shall be trained to identify asbestos containing building materials (ACBM) and the hazards associated with asbestos in accordance with the OSHA Asbestos Standards (29 CFR 1910.1001 and 29 CFR 1926.1101) and state/local certification requirements. This training provides personnel with a better understanding of asbestos and the steps to be taken to protect themselves and the public. In areas that ACBM was identified, required NYSDOL and NYCDEP procedures shall be followed. All personnel must provide proof of an up-to-date fit-testing and medical clearance, and completion asbestos certifications required for the employee's scope of work. Proof of personnel qualifications must be presented upon request, including qualifications for wipe sampling, microvac sampling, personal monitoring and HVAC evaluations.

2.5.1 Project Monitors

The Project Monitors must possess valid New York State (NYS) Asbestos and Lead Project Monitor certificates. The Project Monitors must have served as a third party project monitor on at least 25 asbestos and lead abatement projects. Project Monitor must have performed final clearance inspections on at least 25 asbestos and lead abatement projects. The Project Monitor must have access to translation services to schedule unit inspections with residents, workers, and/or owners.

2.5.2 Microvac Technicians

Microvac sampling technicians must have at least 6 months of experience in multimedia sampling for a variety of contaminants. Employees shall have received specific training in microvac sampling methods.

2.5.3 Wipe Sampling Technicians

Wipe sampling technicians must have at least 6 months of experience in multimedia sampling for a variety of contaminants. Employees shall have received specific training in wipe sampling methods.

2.5.4 Air Sampling Technicians

Air sampling technicians must have at least one year experience in air sampling for a variety of contaminants. Employees shall have received specific training in air sampling methods.

2.5.5 HVAC System Inspectors

HVAC assessments and cleanliness inspections shall be conducted by qualified personnel. At a minimum such personnel shall have an understanding of HVAC system operation and experience in utilizing accepted indoor environmental sampling practices, current industry HVAC cleaning procedures, and applicable industry standards. Qualifications for members of the HVAC evaluation team are specified in Attachment 4A, Indoor Dust Sampling Protocols.

3.0 PROJECT PLANNING (SCOPING)

3.1 Project Background

This QAPP is the result of ongoing efforts to monitor the current environmental conditions for residents and workers impacted by the collapse of the World Trade Center (WTC) towers. The SAP describes the approach to be used to evaluate the presence and levels of contaminants of potential concern in individual units and buildings in lower Manhattan. This plan is a modification of earlier versions. The final plan reflects appropriate elements from the comments received from the public, individual members of the WTC expert technical review panel and subsequent discussion and review by EPA staff. EPA will offer a voluntary test, and clean program targeted at the area below Canal Street and west of Allen-Pike Street that was targeted in the original dust cleanup program. This area entirely contains the area where visible contamination with WTC dust was confirmed by the Environmental Photographic Interpretation Center (EPIC). Services will be offered as described in the SAP. There will be a period of two months during which residents and building owners in this area may make requests to participate in this program. Employees and employers will not be eligible for this program.

4.0 DEVELOPMENT OF PROJECT QUALITY OBJECTIVES (PQOs) (SITE SPECIFIC PQOs)

Concurrent efforts have the following PQOs:

1. To measure the asbestos, lead, MMVF and PAH content of samples obtained from volunteered spaces within buildings in lower Manhattan;

2. Provide data to support the decision of whether or not cleaning should proceed in the units and buildings sampled.

4.1 Measurement Performance Criteria

The QA program shall incorporate QC procedures for field sampling, COC, laboratory analyses, and reporting to assure generation of sound analytical results. A number of QC samples are to be collected and analyzed during this project (such as blanks and duplicates). Their use, in general, is to ensure that the measurement process is in control and is producing reliable data. Additional criteria that will be used to evaluate and ensure that the measurement process is in control and is producing reliable data can be found in the validation standard operating procedures (SOPs).

The QC results may be used to assess the ongoing validity of the process and/or to determine whether modifications to the process would be appropriate. Project management shall review the individual and cumulative QC results periodically for this purpose. One result of this review may be the decision to reduce or eliminate one or more type of QC sample, if the results show that it is not needed. Another result may be the decision to increase the frequency of duplicates if the initial duplicates show great variation between the co-located pairs indicating that the number of sample(s) being collected per unit may not produce a representative characterization of that unit. In most occurrences, changes to QC samples collection or frequency of duplicates collection will not take place unless specified in the SAP.

The QA Protocols for this sampling event are applicable to all sample matrices and include:

1. Sample documentation in the form of field logbooks, appropriate field data sheets, and chain of custody records.

2. Calibration and inspection of all monitoring and/or field-portable analytical equipment prior to collection and analyses of samples with results and/or performance check procedures/methods summarized and documented in a field, personal, and/or instrument log notebook.

3. Field or laboratory determined method detection limits (MDLs) shall be recorded along with corresponding analytical sample results, where appropriate.

4. Analytical holding times as determined from the time of sample collection through analysis. These shall be documented in the field logbook or by the laboratory in the final

data deliverable package.

5. Initial and continuous instrument calibration data.

6. QC blank results (rinsate, trip, method, preparation, instrument, etc.), as applicable.

7. Collection and analysis of blind field duplicate and matrix spike/matrix spike duplicate (MS/MSD) QC samples to provide a quantitative measure of the analytical precision and accuracy, as applicable.

8. Use of the QC procedures specified in this QAPP for QC analyses and data validation.

5.0 SECONDARY DATA EVALUATION

The results from sampling in this program will be considered by EPA to make recommendations about unit, common area and HVAC cleanups. Source attribution will also be considered such as: location and amount of friable asbestos material present in sampled space; location and area of MMVF present (i.e., ceiling tiles, pipe insulation, spray on fireproofing); location and amount of chalking/peeling paint present; current use of space; significant particulate or combustion sources within sampling areas (e.g., fireplace, stove, occupant smokes); significant particulate or combustion sources within or adjacent to the building (e.g., above fast food restaurant, adjacent to emergency diesel generator exhaust, etc). Source attribution will be a critical factor in determining whether to re-clean or re-test after cleaning.

6.0 PROJECT OVERVIEW

EPA will clean up building units and common areas found to have contamination above specified benchmarks. Building common area sampling data will be evaluated to determine the need for HVAC cleanup.

All work shall be completed in accordance with the Statement of Work, SOPs, this QAPP and the SAP, all reference sampling methods, and the HASP. No deviations from the Statement of Work, the SAP, this QAPP or the HASP shall be made without prior receipt of alternate technical direction issued by the EPA.

All sampling methods, analytical methods, sampling locations, the number of buildings and their geographic locations, specific residential and/or non-residential units, shall be provided by EPA.

It is impossible to determine or address the various conditions that shall affect the sample locations. Actual sample locations shall be determined on a case by case basis in the field by the contractor with approval by the on-site EPA personnel. Every attempt shall be made to collect 100% of the proposed samples as specified in the SAP provided by EPA. In the event a sample cannot be collected due to the unavailability of carpets, fabric furniture, or insufficient sample

area, that sample shall not be collected and documentation of that fact recorded in the field logbook.

6.1 Project Schedule

Work shall be scheduled, at a minimum, five days per week. Each building's work schedule is subject to the access schedules of the building owner and residents. The schedule shall also depend on the number of units per building that shall be sampled and cleaned, if necessary. The project schedule is summarized in Table 4 below:

TABLE 4
PROJECT SCHEDULE

Task	Anticipated Completion Date	Performed By
Kick-Off Meeting	22 February 2007	EPA
Draft QAPP & HASP submission	22 February 2007	SAT 2
Final QAPP submission	10 days after receipt of EPA comments	SAT 2
Field work (sampling event at buildings)	15 May 2007 to 15 December 2007	SAT 2 Subcontractors
Field Status Report/QA Management Report	Every Wednesday during field work	SAT 2
Environmental Sampling	Within 24 hours	SAT 2
Cleaning Effort	1 -2 days	ERRS
Analytical Results	7 – 28 days	NEA and EMSL
Verification/Validation of Sample Results	7 – 14 days	QATS
Analytical Report(s)	Analytical Reports submitted daily with 100% of the total samples collected during the project fully validated and submitted in a Final Analytical Report at the completion of the project.	QATS
Residential Notification	Within 14 days	EPA
Final Project Report	30 days from completion of project	SAT 2

7.0 SAMPLING TASKS

7.1 Sampling Process Design and Rationale

In the absence of a measure that can identify WTC dust, EPA will offer a voluntary test, and clean, as necessary, program targeted at the area below Canal Street and west of Allen-Pike Street that was targeted in the original dust cleanup program. This area entirely contains the area where visible contamination with WTC dust was confirmed by EPIC. By examining satellite photography and other evidence, this organization determined the visible extent of deposition of WTC dust and debris. The ground dust/debris boundaries shown in the report were derived from the analysis of multiple images taken between September 11 and September 13, 2001. "Confirmed dust/debris" areas extend to approximately Chambers Street, "probable dust/debris" areas extend to approximately Canal Street, and "possible dust/debris" areas extended to

approximately Spring Street on the West side near the Holland Tunnel. The "confirmed dust/debris" area is the area that EPA believes was most heavily impacted by the dust generated when the towers collapsed.

All buildings and units tested will have a number of characteristics recorded to aid in understanding the sampling results. Building and unit characteristics that may be relevant are described below. This section provides an overview of the strategy to characterize units, the common areas within buildings, and HVACs within buildings, if present. The QAPP describes in detail the protocol for how to determine where and how much to sample within common areas and units.

A "unit" generally denotes a reasonably well defined section of a floor that will be different for each building and building type. For example, a unit within a residential building could be an apartment.

Two sets of dust samples will be taken within each unit: 1) three or more samples at locations where dust-related exposures are likely to occur, such as in elevated horizontal surfaces (e.g., desk or table tops) and floors, and 2) three or more samples at locations where WTC dust may have accumulated but would not have frequently been cleaned, such as on top of cabinets. The first set of samples will be termed, "accessible" samples, the second, "infrequently accessed" samples. Samples from these locations will be taken by wipes and microvacs. These samples will yield results in load (weight or fibers per unit area) and will be compared to benchmarks.

Wipe samples will be analyzed for the COPC lead and PAHs, microvac samples will be analyzed for the COPC asbestos and MMVFs. Wipe and microvac samples will be taken in proximate locations, so that for each location sampled within a unit there will be measurements of the four COPC. Indoor air samples will also be collected in units and common areas at locations proximate to the locations where accessible dust samples are collected. Indoor air samples will be analyzed for asbestos and MMVF.

The decision criteria for a HVAC cleanup use the 95% upper confidence limit (UCL) on a mean contaminant level for accessible areas, infrequently accessed areas, or air samples in common areas. The UCL will be used in the decision process as follows: If the 95% UCL for the estimated building mean in common areas exceeds the benchmark value for a COPC, then this may be considered to provide support for the decision to offer to clean the building HVAC system. Separate analysis will be conducted for air samples, and accessible and infrequently accessed areas, and each will be compared with its own benchmarks. An exceedance of the 95% UCL for any benchmark in air or either set of accessible areas will be the basis for offering a HVAC cleanup.

The analytical results from both the air samples and the dust samples will be used to determine whether or not a cleaning will be offered to the occupant or owner of the unit or common area being tested. In general, a cleanup will be offered if a benchmark for any of the COPC is exceeded in a unit or building common area tested. EPA will conduct surveys to determine if the exceedance may be attributed to sources within or adjacent to the place of business or residence.

If they are, this information will be considered in conjunction with information on building cleaning history to determine whether clearance sampling or further cleaning will be offered. In addition, asbestos, MMVF, and lead bulk samples may be collected as a result of a completed source survey as defined in Attachments 4B and 4C.

7.2 Sampling Procedures and Requirements

SAT 2 shall collect samples for asbestos, MMVF, lead, and PAHs as well as QC samples, in accordance with this QAPP and Attachment 2, 3, 4A and 4D.

QC samples shall be used to assess the sampling and analytical processes and to ensure that these processes are being conducted properly. QC samples shall be collected during each day of sampling. These samples include the collection of field spike samples, field blanks, duplicates, and lot blanks (see Section 10.1, Sampling and Analytical Quality Control Samples for details).

SAT 2 shall collect wipe, micro-vacuum, and indoor air samples from residential and non-residential buildings. Parameters to be analyzed for each sampling technique are specified in Table 5. SAT 2 shall perform all field activities utilizing the appropriate field sampling methods as specified in Table 6.

TABLE 5
SAMPLING TECHNIQUE AND PARAMETERS TO BE ANALYZED

Sampling Technique	Lead	PAHs	Asbestos	MMVF
Wipes	**X**	**X**		
Microvac			**X**	**X**
Indoor Air			**X**	**X**
Bulk*	**X**		**X**	**X**

* Bulk samples, if required for asbestos/MMVF and lead, will be analyzed as specified in Attachments 4B and 4C.

The analytical results from these samples will be used to determine whether or not a cleaning will be offered to the occupant or owner of the unit being tested.

Results from wipes in common areas and indoor air samples of a building will be used to determine whether cleanup of sampled areas will be offered, and results from the building as a whole will be used to determine what further activities with regard to sampling or cleanup are warranted. Further, it should be noted that source attribution will be a critical factor in determining whether to re-clean if an initial cleaning is deemed necessary. Source surveys will be conducted as described in Attachments 4B and 4C and if it is found that the exceedance is due to a source within the building or adjacent to the building, no further cleaning to demonstrate clearance will be offered.

7.2.1 Sampling Collection Procedures

Table 6 below summarizes the collection methods and procedures. SAT 2 shall ensure that all project personnel collect representative samples in a consistent manner for all required sample

matrices and locations, that contamination is not introduced during collection, and that sample volumes are properly preserved in order to meet project objectives. In addition a laboratory blank analysis for asbestos fiber background will be conducted on one sample filter from each lot of filters prior to the use of any filters from that lot.

The microvac sampling will be performed in accordance with American Society for Standards and Materials (ASTM) Method D 5755-03 Standard Test Method for Microvacuum Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy (TEM) for Asbestos Structure Number Surface Loading". Certain requirements of the method are summarized below.

Sampling Media/Cassette Type is 25 millimeter (mm) air sampling cassette, containing 0.8μ or smaller pore size MCE or PC filter. Specification for sampling pump is low volume personal-type, capable of achieving a flow rate of 1 to 5 liters per minute (L/min). The sampling flow rate of the pump may vary as long as the air velocity is 100 (+ or – 10) cm/s. The air velocity calculation is based on an internal sampling tube diameter of 6.35 mm at a flow rate of 2 L/min. Sampling time is a minimum of 2 orthogonal passes on the surface within a minimum of two minutes of sampling time. Size of sampled area of 90 cm^2 is vacuumed until there is no visible dust or particulates matter remaining. Flow calibration devices such as sampling pumps and flow indicators shall be calibrated using a certified standard apparatus or assembly (see Practice D3195 and 7.29 of the standard). Field personnel will perform a leak check of the sampling system at each sampling site by activating the sampling pump with the closed sampling cassette in line. Any air flow shows that a leak is present that must be eliminated before initiating the sampling operation.

All wipe samples will be collected from a 10 x 10 centimeter (cm) area with the aid of dedicated, disposable, templates made by the SKC Inc., (No. 225-2415). A new template shall be used for each surface sample. All glass sample containers shall meet the QA/QC specifications in Office of Solid Waste and Emergency Response (OSWER) Directive 9240.0-05A, Specification and Guidance for Contaminant Free Sample Containers.

Lead wipe samples will be collected using "Ghost Wipes", (SKC Inc., No. 225-2414) wetted with de-ionized water. Samples will be placed in individual 4 oz. glass jars.

Airborne asbestos sampling is conducted with 25-mm diameter, three-piece cassette with 50-mm electrically-conductive extension cowl, cellulose ester membrane filter, 0.8 μm pore size, and backup pad, connected to an air sampling pump. A minimum of 3600 L of air will be sampled at a rate of 10 L/min. The filter cassette and extension cowl will be mounted onto a tripod during sample collection. The SAT 2 will supply all equipment and supplies necessary to perform the work including: air-sampling pumps with maximum flow rate capacity of 15 L/min, tripods, rotameters, flow meters, vacuum gauges for sampling train leak checks, and sample cassettes. Sample filters should only be used after at least two laboratory blanks per lot are analyzed for fiber background. Discard the filter lot if mean count is > 5 fibers per 100 graticule fields. All filters used to sample a residence or a common area should come from the same box/lot.

After sampling, the filter cassette and attached extension cowl are wrapped in aluminum foil and then sealed inside a zip-lock bag.

The sampling train will be leak checked before and after each sample collection. Pump flow rates will be measured before and after sample collection. A primary dry cell calibrator (BIOS DC-Lite or equivalent) will be used to establish the flow rates. Flow rates will be recorded on Air Sampling Data Sheets and in the Site Logbook.

TABLE 6
SAMPLE COLLECTION METHODS AND PROCEDURES

Type of Location	Sampling Locations (See Attachment 7)	Estimated Number of Samples	Parameter	Sampling Technique & Method	Collection Procedures
Accessible	i) Area or wall-to-wall carpeting. Locations include, in the order of most to least preferred location (on the basis of exposure considerations): 1) in the main entrance used for access and egress from the building; 2) carpet in the secondary, less heavily used entrance to the unit; 3) carpet in the center of the most frequently used play area for children under the age of six; and 4) carpet in an acknowledged or evident route of high traffic flow (i.e., stairs, hallway, etc.) ii) Kitchen tiled floor, hardwood floors, or hard floors of other surfaces types (laminate, e.g.) iii) Draperies/curtains in the living room, which is the primary location if unit is a residence, and then draperies/curtains in other rooms of the unit iv) The wall at hand level for a resident child or adult where there are no children v) The wall adjacent to the head of the bed in a child's bedroom, or in the adult bedroom where no children occupy the unit vi) Kitchen counter tops vii) Table or desk tops viii) Upholstered furniture	Scaled to floor area as follows: <1000sf = 3 locations, >1000 <5000sf = 5 locations, >5000sf = 7 locations, >10000sf = 10 locations	Asbestos	Microvac ASTM D 5755-03	**See Attachment 4**
			MMVF	Microvac ASTM D 5755-03	**See Attachment 4**
			Lead	Wipe HUD App. 13.1 (Att. 2)	**See Attachment 4**
			PAHs	Wipe ASTM D 6661-01 (Att. 3)	**See Attachment 4**
Infrequently Accessed	i) Trough of a window sill ii) Top of vent ducts, or hot water pipes iii) On top, beneath or behind large appliances or objects of furniture such as beds, chests, refrigerators, upright freezers, built in file cabinets or bookcases	Scaled to floor area as follows: <1000sf = 3 locations, >1000 <5000sf = 5 locations, >5000sf = 7 locations, >10000sf = 10 locations	Same as accessible	Same as accessible	**Same as accessible**

TABLE 6
SAMPLE COLLECTION METHODS AND PROCEDURES

Type of Location	Sampling Locations (See Attachment 7)	Estimated Number of Samples	Parameter	Sampling Technique & Method	Collection Procedures
Indoor Air Samples	Indoor air sample sets for asbestos and MMVF in common areas sampled Indoor air sample sets for asbestos and MMVF in accessible areas of units sampled	Scaled as follows: small spaces (<160sf), a 3 sample set will be collected; spaces 160sf - 25,000sf, a 5 sample set will be collected; spaces >25,000sf, 1 sample set will be collected for each 5,000sf.	Asbestos	NIOSH 7402 (Att. 7) 3600l sample	**See Attachment 4**
			MMVF	NIOSH 7402 3600l sample	**See Attachment 4**

* Bulk samples, if required for asbestos/MMVF and lead, will be analyzed as specified in Attachments 4B and 4C.

7.2.2 Sample Containers, Volume, and Preservation

All sample containers shall meet the QA/QC specifications in OSWER Directive 9240.0-05A, "Specifications and Guidance for Contaminant Free Sample Containers". The Contractor shall maintain sample integrity in the field, prior to and during shipment to, and immediately upon receipt by, the off-site or mobile on-site laboratory. Table 7 below summarizes the sample containers, volume and preservation of samples required. The Contractor shall collect and contain samples as identified.

TABLE 7
SAMPLE CONTAINERS AND PRESERVATION

Parameter	Sampling Technique	Sample Containers	Holding Time	Preservation
Asbestos	Microvac ASTM D 5755-03	Zip-lock plastic bag	**NA**	**20° C**
MMVF	Microvac ASTM D 5755-03	Zip-lock plastic bag	**NA**	**20° C**
Lead	Wipe HUD App. 13.1	50 milliliter (ml) polyethylene sample tubes	**NA**	**20° C**
PAHs	Wipe ASTM D 6661-01	50 ml polyethylene sample tubes	**7 days(recommended)**	**4° C**
Asbestos	NIOSH 7402	Zip-lock plastic bag	**NA**	**20° C**
MMVF	NIOSH 7402	Zip-lock plastic bag	**NA**	**20° C**

* Bulk samples, if required for asbestos/MMVF and lead, will be analyzed as specified in Attachments 4B and 4C.

7.2.3 Equipment/Sample Containers Cleaning and Decontamination Procedures

SAT 2 shall ensure that collected samples are representative of the sampling location by

verifying that sampling equipment is clean and free of target analytes/COPC or interferences. Cleaning and decontamination shall include all equipment that contacts the sample. If sampling equipment is disposable, procedures for cleaning and decontamination are not necessary. Equipment/sample containers cleaning and decontamination procedures are specified in Attachment 4 of the QAPP.

7.2.4 Field Equipment Calibration, Maintenance, Testing, and Inspection Procedures

SAT 2 shall ensure that all sampling equipment is available and in working order when needed; that all field equipment, including tools gauges, pumps, etc. are calibrated to perform within specified limits; and that corrective action is taken to fix problems prior to and during field operations. SAT 2 shall also establish record keeping for documenting field equipment calibration, maintenance, testing, and inspection activities and identify the availability of spare parts and equipment to ensure that project schedules are met. Field equipment calibration, maintenance, testing, and inspection procedures are specified in Attachment 4.

7.2.5 Supply Inspection and Acceptance Procedures

SAT 2 shall ensure that all sampling supplies are free of target analytes/COPC and interferences and provide inspection and acceptance requirements for any supplies or consumables that could affect data quality. Documentation shall include, but not limited to, supplies that shall be used during sampling, all vendors for supplies and reagents, specifications for all supplies and reagents that could affect data quality, procedures that shall be used to ensure supply cleanliness and reagent purity, procedures for measuring supply cleanliness, and corrective action procedures for preventing the use of unacceptable supplies. This information is contained in Attachment 5.

7.2.6 Field Documentation Procedures

SAT 2 shall provide a permanent record of field activities and possible introduction of sampling error, observations and measurements taken in the field. All field data shall be recorded in field notebooks, on field data collection sheets, or electronically.

Field documentation shall be tracked. Pre- and post-sampling leak checks of the air sampling trains and microvac sampling trains must be documented. The title of each field notebook shall indicate its function, and each notebook used for a specific site or project shall be referenced to all other project notebooks, including the project manager's daily log. Each notebook shall also be tracked and archived with other project records in accordance with project data management. All Field notebooks shall be bound, water-resistant, sequentially numbered pages with indelible ink entries.

Field information shall be recorded for each matrix and each type of sampling procedure. Examples of data collection forms can be found in Attachment 6.

8.0 ANALYTICAL TASKS

The project-specific analytical measurement system shall include: on-site and off-site laboratory analytical SOPs; method-and laboratory specific QC measurements, acceptance criteria, and corrective actions; calibration procedures; and instrument, equipment, and supply maintenance, testing, and inspection requirements. Detailed information on analytical tasks can be found in Tables 8 and 9 below.

TABLE 8
ANALYTICAL TASKS

Analyte	Sample Matrix	Benchmarks	Analytical Method	Laboratory Reporting Limit
Asbestos	microvac	Accessible loading 5000 structures/cm^2, Infrequently Accessed/HVAC 50000 structures/cm^2	ASTM D 5755-03	<1000 s/cm^2
MMVF	microvac	Accessible loading 5000 fibers/cm^2, Infrequently Accessed/HVAC 50000 fibers/cm^2	ASTM D 5755-03 prep SEM analysis	<1000 f/cm^2
Lead	wipe	Accessible loading 40 µg/ft^2 Infrequently Accessed loading 400 µg/ft^2	SW-846 6010C	2 µg/ft^2
PAHs	wipe	Accessible loading 150 µg/m^2 Infrequently Accessed loading 1.5 mg/m^2	SW-846 8270D	5 µg/m^2
Asbestos	Air sample cassette	.0009 S/cc*	40 CFR Part 763	0.0004 s/cc
MMVF	Air sample cassette	.01 f/cc	Phase Contrast Microscopy (PCM) NIOSH 7400 "B" Counting Rules	0.004 f/cc

* The total TEM (AHERA) fiber count will be recorded. A separate PCM-equivalent (PCMe) count will be recorded by modifying the AHERA method to count fibers 5 um or longer in length, and having a length-to-width aspect ratio of 5 or greater. It is this modified-AHERA PCMe fiber count that will be the basis of the asbestos test results and clearance criterion.

* Bulk samples, if required for asbestos/MMVF and lead, will be analyzed as specified in Attachments 4B and 4C.

8.1 Analytical SOPs

All analytical procedures that shall be used in the project must be documented to allow for EPA review and approval. All Contractors shall provide and document how they shall perform specific analytical methods. The analytical SOPs to be utilized on this project are listed in Table 9.

TABLE 9
ANALYTICAL SOP REFERENCE TABLE

Title, Revision Date and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization performing Analysis	Attachment Number
EPA SW-846 6010C	Definitive	Lead	Inductively coupled plasma (ICP)	NEA	8B
EPA SW-846 8270D	Definitive	PAH	GC/MS	NEA	8B
40 CFR Part 763 (AHERA/PCMe)	Definitive	Asbestos-Air	PCM	EMSL	8A
NIOSH 7400 (confirmed with SEM if f/cc>.009)	Definitive	MMVF - Air	PCM	EMSL	8A
ASTM D 5755-03	Definitive	MMVF-microvac	SEM	EMSL	8A
ASTM D 5755-03	Definitive	Asbestos-microvac	TEM	EMSL	8A

* Bulk samples, if required for asbestos/MMVF and lead, will be analyzed as specified in Attachments 4B and 4C.

8.2 Analytical Instrument Calibration Procedures

The laboratory contractor(s) shall ensure that the analytical methods and selected instrumentation meet the project requirements for selective, sensitive, accurate, and precise detection and quantitation of the analytes of interest. It is also necessary to describe completely the calibration procedures for each analytical instrument, as well as demonstrate the ability of the analytical technique to accurately and precisely identify any quantitate the target analytes/COPC at the required quantitation limits (QL) and within the require measurement ranges. Corrective action procedures shall also be documented for instances when the instrument calibration procedures are not met.

All instruments shall be calibrated according to a schedule specified by the method and instrument manual or SOPs. Calibration procedures shall be documented in the analytical SOPs identified in Table 9, Analytical SOP Reference Table.

8.3 Analytical Instrument and Equipment Maintenance, Testing, and Inspection Procedures

The laboratory contractor(s) shall describe in the analytical SOPs identified in Table 9 (Analytical SOP Reference Table) the procedures and documentation activities that shall be performed to ensure that all analytical instrumentation and equipment are available and in working order when needed. Instrument and equipment maintenance logs shall be kept by the Contractor to document analytical instrumentation and equipment maintenance, testing, and inspection activities. The laboratory contractor(s) shall also ensure that project schedules are met (e.g., availability of spare parts or spare instruments, instrument control (on-site and during storage), security, and availability (e.g., log-in/log-out procedures).

9.0 SAMPLE COLLECTION DOCUMENTATION, HANDLING, TRACKING, AND CUSTODY PROCEDURES

SAT 2 shall include all sample collection documentation and sample handling, tracking, and custody procedures used to ensure that sample integrity and custody are maintained. The procedures shall address sample collection, packaging, handling, and shipping, as well as records, receipt of laboratory samples, archiving, and disposal. COC SOPs shall include those procedures associated with sampling and on-site and off-site laboratory analysis.

Procedures for field modification of the QAPP for sample collection documentation, sample handling, tracking, and custody procedures sampling design, number or type of samples or analyses, changing sampling locations, etc. are discussed in Section 12.1, Assessment Findings and Corrective Action Responses.

9.1 Sample Collection Documentation

Proper field sampling and on-site and off-site documentation help to ensure sample authenticity (i.e., the sample identity is correct) and the data integrity. Documentation for sample collection shall be conducted utilizing Scribe.

9.2 Sample Handling and Tracking System

A proper sample tracking system shall support the COC procedures, which in turn help to ensure sample authenticity and data defensibility. SAT 2 shall document the procedures that shall be followed to identify and track samples that are collected in the field, analyzed on-site, and delivered or shipped to an off-site laboratory for analysis, as well as samples transferred throughout the laboratory. If samples are shipped to an off-site laboratory, then the laboratory's sample handling and tracking system must be described.

The sample handling and tracking procedures shall include:

- Sample numbering system for field sample collection and provide an example,
- Sample container identification information,
- Laboratory sample tracking procedures, and
- Sample storage procedures used by the field personnel, the off-site or mobile on-site laboratory.

9.2.1 Sample Handling

Table 10 below identifies each component of the project specific sample handling system, personnel or organizational affiliations who are primarily responsible for ensuring proper sample handling, custody, storage, and disposal, and specify the length of time that samples, digestates and extracts shall be retained by the laboratory prior to disposal.

TABLE 10
SAMPLE HANDLING

SAMPLE COLLECTION, PACKAGING AND SHIPMENT
Sample Collection (Personnel/Organization): SAT 2/Weston
Sample Packaging (Personnel/Organization): SAT 2/Weston
Coordination of Shipment (Personnel/Organization): SAT 2/Weston
Type of Shipment/Carrier: Lead/PAHs - Overnight Courier/FedEx; Asbestos/MMVFs - Hand Deliver to lab
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): EMSL and NEA
Sample Custody and Storage (Personnel/Organization): EMSL and NEA
Sample Preparation (Personnel/Organization): EMSL and NEA
Sample Determination Analysis (Personnel/Organization): EMSL and NEA
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): 365
Sample Extract/Digestate Storage (No. of days from sample receipt): 365

9.2.2 Sample Delivery

Each sample shall be delivered and packaged according to the following protocol and as specified in Attachment 4:

- Wipe samples: Wipe samples shall be placed directly in polyethylene tubes and capped. All capped samples shall be placed in zip-lock bags and labeled with the sample number, time and date of collection, analyses requested, and preservatives used.

- Microvac and Air Samples: remove the filter cassette from the inlet and outlet tubing sections, replace the cassette plugs, and place the sample into a labeled, resealable plastic bag. Label the sample bag with an identifier unique to the sample and sketch the sample location in a field book along with the unique sample identifier.

Note: One temperature blank shall be included in each shipped cooler to verify that the samples were maintained at the required temperature from the time they were placed in the cooler to their arrival at the laboratory. The temperature blank shall be prepared by filling a sample container with unpreserved potable or distilled water. The container shall be labeled "Temperature Blank" and dated. The receiving laboratory shall establish and record the temperature of the blank on the COC Form immediately upon receipt, prior to inventory and refrigeration.

Note: Do not use untreated polystyrene foam in the shipping container because electrostatic forces may cause fiber loss from sample filters.

Sealed bags shall be placed in plastic coolers and delivered to the laboratory. All sample documents shall be sealed in a plastic bag and affixed to the underside of each cooler lid. The lid shall be sealed and affixed on at least two sides with custody seals so that any sign of tampering is easily visible.

All packaging marking and labeling, and shipping samples shall be in compliance with the most recent U.S. Department of Transportation regulations for shipping hazardous and non-hazardous materials. Air carriers that transport hazardous materials require compliance with the current edition of the International Air Transport Association Dangerous Goods Regulations, which applies to shipment and transportation of hazardous materials by air carriers. Shipment papers including bills of landing and air bills, shall be retained by the laboratory with COC records.

9.3 Sample Custody

COC procedures ensure accountability for the location and integrity of the sample at all times. A sample is in "custody" if it is in the actual physical possession of authorized personnel or in a secured area that is restricted to authorized personnel. An evidentiary paper trail documenting sample custody is required in order to meet project quality objectives. Sample custody documentation procedures shall be documented in the field and analytical SOPs.

A COC record shall be maintained from the field sampling team's procedures for maintaining and documenting sample custody from the time samples are collected in the field through packaging, shipment, and delivery to the laboratory. Sample custody continues with the laboratory's procedures for maintaining and documenting sample custody from the time the samples are received at the laboratory through analysis, archiving, and disposal. Every transfer of custody must be noted and signed for, and a copy of this record kept by each individual who has signed. When samples (or groups of samples) are not under direct control of the individual responsible for them, they must be stored in a locked container sealed with a custody seal.

The COC record shall include (at minimum) the following:

- Sample ID
- Sample information
- Sample location
- Sample date
- Name(s) and signature(s) of sampler(s)
- Signature(s) of any individual(s) with custody of samples

At the end of each sampling event, the personnel who collected the samples shall generate COC forms electronically using Scribe or an alternative electronic format that is approved by EPA. The COC forms shall be printed out and signed on-site. An electronic copy shall also be provided to EPA. This electronic file can be used by EPA to create spreadsheets or tables of validated analytical data.

A separate chain of custody form must accompany each cooler for each daily shipment. The chain of custody form must address all samples in that cooler, but not address samples in any other cooler. This practice maintains the chain of custody for all samples in case of mis-shipment.

10.0 QUALITY CONTROL SAMPLES

This section addresses QC samples. QC is the set of activities that are performed for the purposes of monitoring, measuring, and controlling the performance of a measurement process. QC samples provide measurable data quality indicators (DQI) used to evaluate the different components of the measurement system, including sampling and analysis.

10.1 Sampling and Analytical Quality Control Samples

This section details the Quality Assurance/Quality Control (QA/QC) requirements for field activities performed during the sampling effort.

It should be noted that microvac and wipe sample field duplicates shall be co-located as close as possible to the original sample template.

QA/QC samples shall include the collection of one field duplicate and one MS/MSD sample for each sampling technique at a ratio of 1 per 10 samples for each parameter. Extra sample volume shall be submitted to allow the laboratory to perform matrix spike sample analysis. This analysis provides information about the effect of sample matrix on digestion and measurement methodology. Field duplicate samples provide an indication of analytical variability and analytical error and shall not be identified to the laboratory.

Field blank samples shall be collected to determine if the sample media could become contaminated during the sampling event. One field blank shall be collected for each parameter for every unit that is sampled. These samples are to be collected by removing the media from its container or package, handling as it as would be done during the actual sampling procedure and placing the media back into the sample container. Results of these samples shall determine if any contamination was detected above the reporting limit or established benchmarks for this program that would affect the results or quality of the data.

Lot blank samples shall be collected to determine if the media used to collect the samples was contaminated. One lot blank (unopened media) shall be collected for each parameter each day. Results of these samples shall determine if any contamination was detected in the sampling media above the reporting limit or established benchmarks for this program that would affect the results or quality of the data. In addition a laboratory blank analysis for asbestos fiber background will be conducted on one sample filter from each lot of filters prior to the use of any filters from that lot.

11.0 DATA MANAGEMENT TASKS

All project data and information must be documented in a format that is usable by project personnel. Therefore, the QAPP describes how project data and information shall be documented, tracked, and managed, from generation in the field to final use and storage, in a manner that ensures data integrity, defensibility, and retrieval.

11.1 Project Documentation and Records

All appropriate data, original field forms/data sheets, and COC forms shall be collected and completed in accordance with the instructions contained in the SAT 2 and laboratory contracts and shall be submitted to EPA. This information shall be provided via Scribe or an alternative electronic format that is approved by EPA. Lead and PAH samples and copies of necessary documentation shall be delivered daily via overnite shipment to:

Northeast Analytical Inc.
2190 Technology Drive
Schenectady, NY 12308
(518) 346-4592

Asbestos and MMVF samples and copies of necessary documentation shall be hand delivered daily to:

EMSL Analytical, Inc.
307 West 38th Street
New York, NY 10018
(212) 290-0051

SAT 2 and the laboratory contractors shall also maintain a copy of each deliverable and all field documentation submitted under this project for 365 days. SAT 2 and the laboratory contractors shall review all deliverables prior to its submission to the EPA. The review shall assure that each deliverable is accurate and complete, technically sound, and free of clerical errors**.**

11.2 Data Package Deliverables

All contractors are required by contract to maintain the field data, laboratory data and analysis results at the site that performed the analysis for 365 days after EPA acceptance of test results. The laboratories shall provide a copy of all sample calculations with each deliverable.

11.3 Data Reporting Formats

Any manual entry of data by the laboratory contractor(s) into a database shall be verified by the following procedure. This procedure is to be followed from the inception of the project for all spreadsheets sent by the contractor to EPA for entry into the database.

a. The contractor's data analyst enters the validated data into a spreadsheet format.
b. The contractor's analyst prints out a hard copy of the spreadsheet and places it into the raw data file.
c. A second contractor data review analyst then reviews every entry that is made into the spreadsheet.
d. The contractor's review analyst then returns the file to original data entry analyst if errors are found.
e. Any found errors are corrected and steps b through d are repeated.
f. Documentation of this review and verification shall be maintained for each data file by the contractor.

Once the verification of the data is complete, the electronic file is sent to the EPA Region 2 Data Management Team and loaded into the database.

Analytical data files are to be received daily by EPA Region 2 Data Management Team electronically from the QATS contractor. EPA shall load the result files (spreadsheets) received from the QATS contractor into a local database. The spreadsheets the QATS contractor shall provide are a collaboration of information from the contracted laboratory EDD or an alternative electronic format approved by EPA. EPA shall also load Scribe files to ensure capture of any additional sampling information that may be useful.

11.4 Data Handling and Management/Tracking and Control

All project documentation shall be maintained in the EPA Project Files for WTC related activities; this includes but is not limited to: records of communication, access agreements, field notes, field data sheets, QAPPs, sampling plans, sampling reports, and summary tables of the analytical data. As required by the Data Management Supervisor all laboratory analytical data is to be submitted in electronic format only, unless otherwise specified by EPA. The data management team is responsible for maintaining these electronic files.

All documentation and records shall be maintained for a minimum of one year in the EPA Region 2 record center and shall be retired to the Federal Record Center for a minimum of 10 years.

12.0 PLANNED ASSESSMENTS

In addition to the following, the System Audit procedure shall be conducted in accordance with the relevant sections of this QAPP. EPA is the responsible organization to conduct the field sampling and laboratory technical systems audits (TSA). Attached to this QAPP are the relevant sections of the SAT 2 Quality Assurance Manual: Assessment and Response Actions (Attachment 10A).

SAT 2 shall observe sampling operations. The laboratory QA Officers shall review subsequent analytical results to ensure compliance with the QA/QC requirements of the project/sampling

event.

All data generation and collection operations shall include at least one field sampling TSA at the start of field sampling activities so that effective corrective action measures can be implemented to mitigate the extent and impact of identified nonconformances. A thorough on-site audit shall be conducted during which sampling design, equipment, instrumentation, supplies, personnel, training, sampling procedures, COC, sample handling and tracking, data reporting, data handling and management, data tracking and control, and data review procedures are examined for conformance with the QAPP. Results of the TSA shall be forwarded to the EPA QA Officer within 14 days of the event. Additional TSAs may be specified at the discretion of the EPA SC. EPA reserves the right to conduct unannounced TSA for all contracts.

12.1 Assessment Findings and Corrective Action Responses

In addition to the following, the Corrective Action procedure shall be conducted in accordance with the relevant sections of the SAT 2 and analytical laboratories' Quality Assurance Manuals: Assessment and Response Actions.

All provisions shall be taken in the field and laboratory to ensure that any problems that may develop shall be dealt with as quickly as possible to ensure the continuity of the project/sampling events. Field modifications to procedures in the QAPP must be approved verbally by the EPA SC before the modifications are implemented and then documented in the Site Logbook and the Sampling Project Report. Corrective action in the field may be necessary when the sampling design is changed. A change in the field may include, for example: increasing the number or type of samples or analyses; changing sampling locations and/or modifying sampling protocol. When this occurs, SAT 2 shall identify any suspected technical or QA deficiencies and note them in the field logbook. The analytical laboratory QA officer shall be responsible for assessing the suspected deficiency and determining the impact on the quality of data. A written notification of all confirmed deficiencies shall be forwarded to the EPA Project Officer.

13.0 QA MANAGEMENT REPORTS

Periodic QA management reports ensure that managers and stakeholders are updated on project status and results of all QA assessments. Efficient communication of project status and problems allows project managers to implement timely and effective corrective actions so data generated can meet PQOs. SAT 2 shall provide EPA with all data, original field forms/data sheets, and chain of custody forms for this project. For the duration of the project, on every Wednesday SAT 2 shall submit an email to EPA providing a field status report/QA management report, indicating the work completed during the prior week. Assessment checklists, reports, requests for corrective action letters, and the corrective response letters (refer to Section 12.1) shall be included as attachments to or referenced in the QA management reports.

All QA management reports shall be included as attachments to the final project report. The following issues shall be included in the final project report, either as part of the QA

management report or in a QA/QC section of the final project report:

- Summary of project QA/QC programs and training conducted during the project;
- Conformance of project activities to QAPP requirements and procedures;
- Status of project and schedule delays;
- Deviations from the approved QAPP and approved amendments to the QAPP;
- Results and trends of proficiency testing (PT) samples performed by all laboratories (per analytical group, matrix, and concentration level);
- Description and findings of TSAs and other assessments;
- Results of data review activities in terms of amount of usable data generated;
- Required corrective actions and effectiveness of corrective action implementation;
- Data usability assessments in terms of precision, accuracy, representativeness, completeness, comparability (PARCC), and sensitivity; and
- Limitations on the use of measurement data generated.

14.0 FINAL PROJECT REPORT

The issues listed above must be addressed in the QA management reports (as attachments to the final project report) or the QA/QC section of the final project report to be submitted to EPA within 30 days from the completion of the sampling portion of the project. The final project report shall be prepared to provide a detailed accounting of what occurred during this project. Information provided shall include: time of major events, dates, personnel on site (including affiliations), summarize and describe the sampling program and field activities, and include any deviations from the QAPP, SOPs, and standard methods. Maps depicting site layout, contaminant source areas, and sample locations shall be included in the project report. A map depicting each building unit and the sample locations shall be generated in a 24" x 36" format. Information regarding the analytical methods or procedures employed, sample results, QA/QC results, chain of custody documentation, laboratory correspondence, any deviations from the QAPP, SOPs, and standard methods, and raw data shall be provided within the QA management reports (as attachments to the final project report) or the QA/QC section of the final project report. The final project report must also address additional data quality concerns, including, but not limited to, the following:

- Narrative and timeline of project activities;
- Summary of PQO development;
- Reconciliation of project data with PQOs;
- Summary of major problems encountered and their resolution;
- Data summary, including tables, charts, and graphs with appropriate sample identification or station location numbers, concentration units, percent solids (if applicable), and data quality flags; and
- Conclusions and recommendations.

15.0 OVERVIEW/DATA REVIEW STEPS

Sections 15.1 through 15.3 of this QAPP defines three distinct evaluative steps that are used to ensure that project data quality needs are met. These data review steps are required for all data collected and used in environmental projects. All three data review steps apply to all aspects of data generation, including field sampling and analytical activities.

15.1 Step I: Verification (review for completeness)

All Contractors are responsible for the confirmation by examination and provision of objective evidence that the specified requirements (i.e., sampling and analytical procedures) have been completed.

15.2 Step II: Validation

The QATS Contractor shall confirm by examination and provision of objective evidence that the particular requirements for a specific intended use are fulfilled. Validation is a sampling and analytical process that includes evaluating compliance with method, procedure, or contract requirements and extends to evaluating against criteria based on the quality objectives developed in the QAPP (e.g., the QAPP measurement performance criteria [MPC]). The purpose of validation is to assess the performance of the sampling and analysis processes to determine the quality of specified data. It is divided into two subparts:

- Step IIa assesses and documents compliance with methods, procedures, and contracts.
- Step IIb assesses and documents a comparison with MPC in the QAPP.

15.3 Step III: Usability Assessment

All Contractors shall make a determination of the adequacy of data, based on the results of validation and/or verification, for the decisions being made. The usability step involves assessing whether the process execution and resulting data meet project quality objectives documented in the QAPP.

Table 11 below describes the objectives, scope, steps, and output of data review associated with each process term.

TABLE 11
DATA REVIEW

Process Term	Objective	Scope	Data Review Step	Output
Verification	Review to see if data required for the project are available.	– Sampling – Analysis	I. Completeness check	Verification Report Package includes all documentation

TABLE 11
DATA REVIEW

Process Term	Objective	Scope	Data Review Step	Output
Validation	– Assess and document the performance of the field sample collection process. – Assess and document the performance of the analytical process.	– Sampling – Analysis	IIa. Check compliance with method, procedure, and contract requirements. IIb. Compare with measurement performance criteria from the QAPP	Validation Report Includes qualified data
Usability Assessment	Assess and document usability to meet project quality objectives.	- Sampling - Analysis	III. Assess usability of data by considering project quality objectives and the decision to be made.	Usability Report

Laboratory analytical results shall be assessed by the QATS contractor for compliance with required PARCC and sensitivity.

SAT 2 shall perform the usability assessment to ensure that the PQOs are understood and the full scope is considered. The items listed in Table 12 below are examples of specific items that shall be considered during this project under the usability assessment.

TABLE 12
USABILITY ASSESSMENT

Item	Assessment Activity
Data Deliverables and QAPP	Ensure that all necessary information was provided, including but not limited to validation results.
Deviations	Determine the impact of deviations on the usability of data.
Sampling Locations, Deviation	Determine if alterations to sample locations continue to satisfy the project objectives.
Chain-of-Custody, Deviation	Establish that any problems with documentation or custody procedures do not prevent the data from being used for the intended purpose.
Holding Times, Deviation	Determine the acceptability of data where holding times were exceeded.
Damaged Samples, Deviation	Determine whether the data from damaged samples are usable. If the data cannot be used, determine whether resampling is necessary.
PT Sample Results, Deviation	Determine the implications of any unacceptable analytes (as identified by the PT sample results) on the usability of the analytical results. Describe any limitations on the data.
SOPs and Methods, Deviation	Evaluate the impact of deviations from SOPs and specified methods on data quality.
QC Samples	Evaluate the implications of unacceptable QC sample results on the data usability for the associated samples. For example, consider the effects of observed blank contamination.
Matrix	Evaluate matrix effects (interference or bias).
Meteorological Data and Site Conditions	Evaluate the possible effects of meteorological (e.g., wind, rain, temperature), source attributions, and site conditions on sample results. Review field reports to identify whether any unusual conditions were present and how the sampling plan was executed.
Comparability	Ensure that results from different data collection activities achieve an acceptable level of agreement.

TABLE 12
USABILITY ASSESSMENT

Item	Assessment Activity
Completeness	Evaluate the impact of missing information. Ensure that enough information was obtained for the data to be usable (completeness as defined in PQOs documented in the QAPP).
Background	Determine if background levels have been adequately established (if appropriate).
Critical Samples	Establish that critical samples and critical target analytes/COPC, as defined in the QAPP, were collected and analyzed. Determine if the results meet criteria specified in the QAPP.
Data Restrictions	Describe the exact process for handling data that do not meet PQOs (i.e., when measurement performance criteria are not met). Depending on how those data shall be used, specify the restrictions on use of those data for environmental decision-making.
Usability Decision	Determine if the data can be used to make a specific decision considering the implications of all deviations and corrective actions.
Usability Report	Discuss and compare overall precision, accuracy/bias, representativeness, comparability, completeness, and sensitivity for each matrix, analytical group, and concentration level. Describe limitations on the use of project data if criteria for data quality indicators are not met.

16.0 STREAMLINING DATA REVIEW

Streamlining data review refers to a process of eliminating some requirements for validation that are deemed no longer necessary to preserve data integrity. Streamlining data review is meant to reduce time and costs while still confirming the quality of the data. Thus, any streamlining option shall recognize that:

- The types and amounts of data reviewed shall be sufficient to develop a clear understanding of the quality of the data;
- The practice of reviewing a subset of data (or a data indicator such as a successful PT sample) as a substitute for reviewing all data shall be reevaluated if problems are detected that call into question the quality of the data set; and
- Streamlining data review occurs when efficiencies are created in the data review process by the following actions:
  - Looking at a subset of data that is representative of a larger universe, and
  - Examining the data in an alternative manner (e.g., through the use of batch-specific PT samples).

Any decisions with regards to streamlining shall only occur in consultation with EPA's QATS contractor and in consultation with, and the approval of, the EPA SC as to the nature and type of streamlining to be conducted.

17.0 REFERENCES

1. EPA Requirements for Quality Assurance Project Plans, QA/R-5, March 2001

2. US EPA Region 2 Guidance for the Development of Quality Assurance Project Plans for Environmental Monitoring Projects, April 2004

3. Intergovernmental Data Quality Task Force Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP) Manual, Version 1, 505-B-04-900A, July 2004

4. Quality Assurance Technical Support Program, Data Validation Standard Operating Procedures

5. SW-846 Method 6010C, Inductively Coupled Plasma-Atomic Emission Spectrometry

6. SW-846 Method 8270D, Semivolatile Organic Compounds by GC/MS

7. SW-846 Method 9045C, pH Electrometric Measurement

8. US EPA AHERA Methodology

9. US EPA. 2003a. World Trade Center Indoor Environment Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks. Prepared by the Contaminants of Potential Concern Committee of the World Trade Center Indoor Air Task Force Working Group. May, 2003.

10. OSWER Directive 9240.0-05A, "Specifications and Guidance for Contaminant Free Sample Containers"

11. ASTM Standard Method Micro vacuum Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy for Asbestos Structure Number Concentrations, designation D 5755-03

12. ASTM Standard Practice for Field Collection of Organic Compounds from Surfaces Using Wipe Sampling, designation D 6661-01

13. NIOSH Methods 7400, 7402

In addition, methods contained in the Housing and Urban Development (HUD) Appendix 13.1: Wipe Sampling for Settled Lead-Contaminated Dust.